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CURRENT SERIAL RECORDS

TELEPHONE ENGINEERING INFORMATION

These information letters are intended to provide a means for answering questions that arise in the field and to inform the field of new developments. They are not intended to be instructions nor to replace in any respect the approved channels for establishing requirements and procedures.

T E and C M Sections Distributed since Letter No. 28, dated March 1962

Rev. TE&CM-415, Transmission Objectives, March 1962  
Rev. TE&CM-810, Central Office Electrical Protection, March 1962  
Rev. TE&CM-630, Design of Aerial Cable Plant, March 1962  
Add. 1, TE&CM-611, Design of Pole Lines, March 1962  
Add. 2, TE&CM-615, Design of Open Wire Plant, March 1962  
Add. 1, TE&CM-616, Construction of Bare Open Wire Plant, March 1962  
Add. 4, TE&CM-690, Joint Use of Poles, March 1962  
Add. 1, TE&CM-422, Subscriber Loop Transmission Calculations, Loop Loss Factor Method, April 1962  
Add. 2, TE&CM-406, Attenuation Data, April 1962  
Rev. TE&CM-156, Nationwide Toll Dialing, April 1962  
Add. 2, TE&CM-821, Multipair Distribution Wire Protection, May 1962  
Add. 3, TE&CM-157, Customer Toll Dialing, May 1962  
Add. 1, TE&CM-430, Subscriber Line Loading, May 1962  
New, TE&CM-816, Electrical Protection of Buried Plant, May 1962  
Rev., TE&CM-640, Design of Buried Plant, May 1962  
Rev., TE&CM-602, Clearances, May 1962  
Add. 5, TE&CM-690, Joint Use of Poles, June 1962  
Rev. TE&CM-102, Numerical Index, July 1962  
Add. 1, TE&CM-218, Plant Annual Cost Data for System Design Purposes - July 1962  
New TE&CM-670, Corrosion Considerations in Outside Plant is being printed and should be distributed about August 1.  
Rev. TE&CM-701, Station Installations, is being printed and also should be distributed about August 1.

Plans are underway to begin listing electronic equipment in the "List of Materials." We hope to have voice frequency repeaters and carrier equipment in the October issue. These are to be followed shortly by point-to-point and mobile radio if there are not too many problems involved in these.

A comprehensive evaluation of the Kellogg KE-6 negative impedance VF repeater has been made on the facilities of the Wickstrom Telephone Company, Karlstadt, Minnesota. This has indicated that this repeater is electrically equivalent to the performance characteristics of the Western Electric Company, E-6 repeater. The KE-6 repeater is available also with line building-out units (LBO) so that it can be readily used with either D66 loading or in trunks composed of D66 and H88 loading. The higher structural return loss of D66 loading in conjunction with the higher gains of negative resistance repeaters make possible the use of finer gauge cables. This makes economies possible, and also meets required transmission objectives. Other advantages of this type repeater are improved overall circuit performance, ease of placement into service and also ease of maintenance.

A Stromberg-Carlson electronic community dial office will go into service at Aetna, New York, in August in the territory of an independent non-REA borrower.

Mr. Donald J. Riney, of the Telephone Standards Division Central Office Equipment Branch is attending an eight-week training course on automatic toll ticketing at the Stromberg-Carlson plant in Rochester, New York.

Field tests are to be made on a Kellogg carrier for battery reversal type semi-post-pay paystations.

A Stromberg-Carlson automatic number identifier working into a Bell System CAMA equipped office is about to go into service at Napanee, Indiana. The identification is transmitted between the offices by multi-frequency pulses. It may prove to be economical for offices smaller than 200 lines.

A field evaluation of cable carrier on multipair distribution wire is to be made to determine what interference results from low frequency radio, what protection problems exist, etc.

ETV (Education Television) is spreading. REA staff engineers are following its progress to be ready to provide technical assistance to borrowers who may become involved.

Comments from field engineers are slow in coming in on Form 397c, specifications for subscriber carrier, also on the proposed revision of TE&CM-205, Preparation of an ACD.

Field evaluation is to be made of Panhandle L. N. Carrier which is compatible with Bell System N carrier at the other end of a trunk.

TSD Staff engineers are evaluating some types of in-band signaling systems for carrier, some with E & M signaling and some with either E & M or loop dial signaling for compatibility with different types of toll ticketing systems.



The A. T. & T. Company has announced IMTS, "Improved Mobile Telephone Service," which is a dial two-way radio with automatic trunk hunting in multi-channel areas. REA staff engineers are investigating its impact on the telephone program. At the present time only Motorola and the General Electric Company have mobile dial radio equipment approved for use in REA borrowers' systems.

A state sponsored program is under development for training of telephone personnel in Virginia. It is called the State Apprenticeship Program. The State supplies guidance and finances it. It is desired for carrier maintenance training. For telephone workers it is a four-year program. It involves on-the-job training and night school.

A detailed field evaluation of the S. C. 546 negative impedance VF Repeater in facilities of the Hillsdale County Telephone Company, Michigan 528, have indicated this repeater to be unacceptable in REA borrowers' plants at this time. REA is closely working with the manufacturer to overcome these problems so that specific recommendations relating to the use of this repeater will be made after all required changes have been made by the manufacturer and final evaluation has been made by REA. Also, at this time, neither the 541 or 546 repeater is capable of being strapped for D66 loading.

REA Form 397d - Point-to-point radio (microwave) will be out in draft form in August for review and comments within REA and by industry.

PC-2, splicing specification for plastic cable has been submitted to Committee A for acceptance and should be printed in August for distribution.

Development of methods for pressurizing buried cable is progressing. Three methods for by-passing pedestals are under development. Field tests are being made and details for installation of pressurization of buried cable may be available early next year. These developments contemplate that the pressurization can be applied to existing plant.

An anchor device for preventing frost heaving of buried plant terminal housing is being field tested in Wisconsin. A consulting engineer there is assisting. The device is a small drive anchor which can be driven into the ground below a pedestal. It has a wire attached which also attaches to the pedestal to prevent heaving.

To provide added flexibility to the design of buried plant in areas of low subscriber density, a new type of wire facility has been developed, and is presently under consideration by REA. If successful it will be known as the Bji-19L unit. This wire is similar in size and shape to the conventional Bji-19 wire, but has one-half its capacitance. This allows an increase in length of the end section for the subscriber beyond the last loading point thereby effectively utilizing cable pairs by keeping line fill at an optimum value. The low capacitance is made possible by the expanded polyethylene used to insulate the conductors,

and which has a much lower dielectric constant than conventional polyethylene. Its first application is in the Nebraska 541 Oxford exchange. The REA staff engineers will make transmission measurements on this type wire in the near future.

Increased battery voltage has been found desirable for increasing the distances to which subscriber physical lines can be served with all cable types of plant, especially buried plant, and using conventional telephone sets. The unit which makes this possible is called a "battery booster" and is presently made by one manufacturer. In principle it is a d-c to d-c converter powered from 48 volt CO batteries and producing a 24 d-c output. This additional 24 volts of talking battery is inserted in series with the conventional 48 volt battery but on the opposite side of the line for a total of 72 volts. This allows sufficient current in telephone set transmitters distances up to approximately twenty miles from the CO with 19-gauge cable. To insert the booster battery into the line, a long line adapter is of course required. Also since the use of the booster battery will be for loops which exceed 1500 ohms, the long line adapter will be available in any case. However, some changes may be required in the long line adapters for inserting this battery in series with the 48 battery. Proper readjustment of the pulsing relays in the long line adapters where using this booster battery may be necessary. The REA staff engineers will further evaluate these devices in several installations in new and existing systems in the near future.

A draft of a revised REA TE&CM-205, Preparation of an ACD, was issued to the field engineers at the annual conference. The text has been brought up-to-date from the 1957 issue, and the specimen area coverage design which accompanies it now includes:

1. A new five-party buried plant exchange illustrating significant design features
2. A new eight-party aerial plant exchange
3. An expanded and reinforced Flagstaff exchange for upgrading service to 5-party from 3-party

The revised section and its specimen ACD includes circuit-by-circuit design procedures and other new items including outside plant materials, engineering criteria for upgrading service, area coverage recommendations, transmission techniques, and many other revised concepts. It is expected to be issued in final form this fall.

The TWX teletypewriter system will be converted to dial September 1, 1962. Thereafter all new machines will be 100 wpm. Presently they are all 60 wpm. These will be converted on a progressive basis. Until all eventually are 100 wpm, it is necessary to have converters at certain intermediate toll switching points. Dial operation of TWX requires "data boxes" at each machine to send and receive on voice frequency bands using FM. The station loops connect to line finders and dial the distant TWX stations by the 2-5 numbering plan plus the 3 digit area code where required and ring the called station from connectors with



the usual 20 cycle ringing. The TWX telephone set has a receiver only to listen for dial tone and busy tone. It has no transmitter. The connections from calling to called central offices will be over the regular telephone toll system. There will be no special trunks for the TWX. Called stations can be either manned or unattended. Unattended stations send an "answer-back" to the calling station as a "go-ahead" signal.

A General Electric Company microwave system is being installed in the plant of the Highland Telephone Cooperation, Inc. (Tennessee 554), Sunbright, Tennessee. It is the first all solid state multiplex, using no relays, to be installed on an REA borrower's project. A similar system is scheduled for installation by the Parker Valley Telephone Company (Arizona 503), Parker, Arizona.

#### Ribbon and Flat Conductor Station Wire Field Trials and Evaluations.

This wire is of flat adhesive backed 4-conductor inside station wire which has a very pleasing appearance when installed. Its development was initiated by the Bell System for special applications. Extensive REA recommended laboratory tests are being conducted by several suppliers. At the present time this wire is not cheap, and its practical use is limited to extension phones, apartments, commercial buildings, and places where jacketed wire cannot be stapled or where stapling is not desirable. One field trial has been initiated at Iowa 580, Iowa State Telephone Corporation. We would like to hear from you of borrowers who feel they may have an application for this type of station wire and are willing to field test it under REA auspices.

#### Development of Protectors for Transistorized Cable Carrier Repeater Equipment

While our experience with transistorized carrier has in general been excellent, REA has been conducting investigations and laboratory tests to determine better methods of protecting transistorized carrier repeater equipment. Indications are that some cable carrier equipment is more susceptible to lightning damage than others because of design differences. There are many applications of transistorized carrier equipment for which suitable protector devices do not exist. Over the past seven months a gas tube manufactured by Brach has been developed and REA laboratory tested. It is not considered completely satisfactory, but field trials are planned at Shenandoah Telephone Company, Virginia 517, Edinburg, Virginia. We plan a survey of lightning damage of electronic equipment in the very near future.

A cable industry meeting was held here in Washington in June under the auspices of REA. Important features discussed included a draft of Figure 8 cable specifications; feasibility of using copper for shields in regular aerial and Figure 8 cable; and other specification changes.

REA has initiated a specification compliance program covering plastic insulated wire and cable. Samples of purchased materials are being

submitted to REA for evaluation from various parts of the country. Visual and physical tests are made here in REA. Samples are sent by REA to the Frankfort Arsenal, Pennsylvania, for testing for compliance with certain of the specification requirements. Electrical parameters are being field tested by REA staff engineers on a sampling basis.

Field evaluation of fault locating equipment for buried plant is being made in Minnesota.